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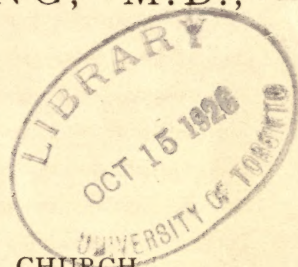
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“**T**HOU hast made them fast for ever and ever, Thou hast given them a law which shall not be broken”; these words of the 148th Psalm sum up one of the explanations of the Cosmos or order of the universe. The alternative is a mechanical or dynamical theory which seeks to find in Matter adequate account of that order whose source the Psalmist recognised as supernatural, relying on the revelation given to his race.

The mechanical theory is set forth as resting on the basis of science. I propose to enquire how far the authority of science may be legitimately cited in this sense. In former times the argument for design was burthened with the attempt to prove that, from observation alone might be inferred not merely the existence of an Artificer but also his attributes. This attempt to carry science into the province of religion failed, and the argument suffered by the fault of its advocates. Now it is sought to place on the basis of science the contrary proposition, that there is no Artificer, Matter alone containing in itself all that is needed for the establishment and maintenance of an orderly universe.

This wide conclusion following on the alleged scientific proof, this notion that all the planetary bodies and their motions, the origin of life and the growth of society, the colours of the opal and the highest efforts of the human imagination and intellect, owe their existence to the mere laws of Matter—it is this that I would examine.

Paley has suffered much, and wrongly, at the hands of modern writers—of all save one, Huxley, whose profound knowledge of nature and acuteness of intellect made him a leader of thought, while his accuracy enabled him to avoid some errors, especially that

of misrepresenting opinions he dissented from: he took care to understand before discussing them. He recognised the true value and meaning of Paley's argument, and, while seeking to minimise its influence, did more than any one to vindicate Teleology as an essential part of the Evolutionary theory.

Now the doctrine of Evolution starts with a "primordial molecular arrangement of which all the phenomena of the universe are the consequences." This Paley admitted. But the sequence of the phenomena is now put under the control of another principle, that of Continuity. This means that the succession of antecedents and consequents shall at no point be broken, that in tracing consequents to their antecedents backwards in time we shall nowhere pass from material to immaterial, from that which is under relations to that which is free from relations, from the Conditioned to the Unconditioned. Those who limit thought by this principle assert it as the duty of science to postpone as far as possible any interference with the orderly succession of phenomena which, invoking a spiritual agency, shall partake of a miracle. But the point is at last reached when experience fails us, when we cannot devise a material antecedent to the remote consequent with which the Cosmos began. We must then admit an "insoluble mystery," or appeal to unknown laws of matter, which, being unknown, might as well be spoken of as spiritual. Tyndall felt the difficulty and took a strange way of evading it—"Believing as I do in the Continuity of Matter, I cannot stop abruptly where our microscopes cease to be of use. Here the vision of the mind supplements the vision of the eye. By an intellectual necessity I cross the boundary of the experimental evidence and discern in that Matter which we in our ignorance of its latent powers and notwithstanding our professed reverence for its Creator have hitherto covered with opprobrium, the promise and potency of all terrestrial life." This

utterance, which is distinctly theistic, is marred by the mental confusion it betrays, for he goes on—"Considered fundamentally, it is by the operation of an insoluble mystery that life on earth is evolved, species differentiated and mind unfolded from their prepotent elements in the immeasurable past." Need it be remarked that if there is an intellectual necessity there can be no mystery, no operative mystery (whatever that may be), the same thing cannot be at once inscrutable and obviously true.

Huxley speaks of "the fundamental proposition of Evolution that the whole world, living and not-living, is the result of the mutual interaction according to definite laws of the powers possessed by the molecules of which the primitive nebulosity of the universe was composed. If this be true, it is no less certain that the existing world lay potentially in the cosmic vapour, and that a sufficient intelligence could, from a knowledge of the properties of that vapour, have predicted say the state of the fauna of Great Britain in 1869 with as much certainty as one can say what will happen to the vapour of the breath on a cold winter day."

This was said in comment on Darwin's hypothesis: and as Darwin regards evolution as only "the aggregate and product of many natural laws," those laws being "the sequence of events as observed by us," both writers may be held as concurring in the view that Evolution is in its essence a mechanical process, which, if logically followed out, leaves no room for, though it does not expressly exclude, the intervention of intelligence. Mind is thus left in the position of an interested but unnecessary spectator.

Continuity, then, rests on "the powers possessed by the molecules of the primitive nebulosity," and as nothing can be got out of molecules save what has already been put into them by thought, the mechanical theory rests not on science — *i.e.*, organised observation—but on a mental abstraction. J. S. Mill has said—

"The word Nature suggests not so much the multitudinous details of the phenomena as the conception which might be formed of the manner of their existence as a mental whole by a mind possessing a complete knowledge of them: to this conception it is the aim of science to raise itself by successive steps of generalisation from experience." Induction has, however, been set aside, and, in place of the generalisations contemplated by Mill, the order of Nature has been treated deductively: truly, the metaphysician has been more loyal to science than have been her own votaries.

Does, then, experience justify the assertion of Continuity? At the threshold of the enquiry we find ourselves called on to choose one of two divergent opinions. We may endow molecules with all the powers needed, or we may recognise that the first motions of the initial atoms were due to an impulse from without, to the bidding of an intelligence able to foresee the working of the powers thus conferred. There is no third way. Yet, are not these two in effect one? Our intelligence attributes, the Supreme Intelligence bestows powers: unless these two intelligences are supposed to belong to unlike categories, the ultimate analysis leads us to that Intelligence of which our own is a feeble reflection, capable of that foresight which Huxley put hypothetically, which Paley recognised as, nay, claimed as the First Cause, of which the Insoluble Mysteries, the Unknowable, the Unconditioned are variants.

But Evolution has been traced to "a homogeneous indefinite something" whose changes (integrations and differentiations) have resulted in the existing complexity. It is difficult to realise an "indefinite" something which is at the same time "homogeneous," hard to be asked to accept this as the basis of definite knowledge. Nor does the homogeneous indefinite something, assuming that it could exist, square with what we learn from science. Experience

tells us that this world had a beginning, warns us that it will have an end. Science tells us that the transformation of energy cannot go on indefinitely: that the dissipation of energy diminishes the total amount available, and that the time will come when all will be reduced to a state of uniform temperature, whose uniformity, be it high or low, will forbid its raising itself into a higher form of energy. The homogeneous is rather the end than the beginning of things.

If, then, we cannot account for the commencement of the Cosmos without a breach of Continuity, shall we be certain of finding Continuity in other directions?

The origin of organic matter is not within the domain of Chemistry. The organic compounds have been imitated synthetically; but no synthesis confers on them Life, the power of raising inorganic matter into organic, of their own motion. The crystal enlarges (if you prefer to use language of double meaning, you may say grows), but the growth is merely mechanical accretion, there is no alteration of the material used. Spontaneous Generation might save the principle of Continuity, but that is a dream, not even a chemical dream: the supposed instances of it are found to be due to errors of observation. The hypothesis is unproved, rejected (it may be with regret) by those whose contention it would serve. We do not know that any physical laws add or permit the addition to the sum of organic matter now existing.

But the breach of Continuity most nearly concerning us is the advent of mind in the human being. That Man is physically of the same stock with the lower animals is a proposition no one nowadays will care to deny. That his mental endowment separates him from all the lower animals, even the highest, is likewise beyond contradiction. The only question is, could the distinctively human quality of mind be in any sense traceable back

to the lower animals? do any of them offer analogy to the human mind? That is a question which only ultra-logical advocates of Continuity will answer affirmatively. Various attempts have been made to show that thought is only, is not anything more than a register of sense impressions: that these being possessed by the lower animals are inherited by man in virtue of natural selection, and improved in transmission. The intelligence of lower animals has been glorified with the hope of thereby bridging over the gulf, but until it shall have been shown that any one of these animals has the power of forming conceptions, of formulating successive generalisations from experience, and finally giving names to the products of such generalisations, we must hold that the gulf is complete. "Ideas when clothed in words are not sensible objects but mental constructions," and Lewes is beyond the suspicion of favour for aught having the remotest approach to suprahuman suggestion.

Having sketched the lines of argument tending to show that Continuity is an unsatisfactory guide through the complexities of the Cosmos, we turn to the organic world and ask if there we may hope to find reason for believing that mechanical theories rather than intelligence had exclusive influence in securing the order presented to us?

It is a common but erroneous notion that Darwin has satisfactorily accounted for what we see, and has furnished additional evidence in favour of the supremacy of mechanism. Happy as was that hypothesis, stimulating to thought as few scientific conjectures have been, it is still on its trial. Its very purpose has been misunderstood by its adherents. After its first announcement its author had occasion to strengthen it with additional hypotheses, for the most part equally happy: but it is still on its trial. It does not explain variation, but, given that variations occur, it shows how they may become permanent.

It is not a causal but a modal explanation, has nothing to say to the "why" of variation, only deals with the "how" of continuance. The first assumption is that, if variations occurred, —chanced to occur, chance being a brief term for "unknown causes"—if the variations were useful, for utility is essential to the endurance of variations, they might be preserved and improved in transmission. It was further assumed that the variations were slight, and (in later statements of the hypothesis) affected a considerable number of individuals so as to give them a chance of survival. But a new school is raising doubts as to the necessity for slow, small variations: it brushes aside the dictum, "*Natura non facit per saltum.*" Even the term Natural Selection has been questioned by others, as, though a convenient brief phrase, it is apt to bring logical complications in its train. We know what the breeder can do, how he deals with animals favourably situated for the perpetuation of their race and of individuals in which desirable variations may have presented themselves. But whereas the breeder deals with single traits whose variations cannot, under such conditions, affect the general wellbeing, nature has to deal with the sum of characters on which depends not merely continuance of life but capacity for multiplication. The change of a single character may or may not affect one or other of these requirements. If it does, the balance can only be restored by aid of other suitable modifications: these are the correlated changes to which appeal has been made in the difficulties of natural selection. If the correlated changes occur after the variation they must be dictated by something within the animal, a conjecture which multiplies the difficulties of the solution. If they take place along with the variation, they are identified with it, and it is the more likely that nature by one stroke brings about changes affecting several parts and functions of the economy, acts by abrupt modifications rather than by

small, slow variations demanding incessant adaptations. The controversy now beginning recalls that earlier in the century when one school of geologists believed that the intervals between successive periods or formations were marked by catastrophes which terminated one order of things, making room for another. Then came the assertion of uniformity of natural processes with denial of catastrophes. Between these two schools the controversy was long and bitter, until the errors of both, due to exaggeration, were recognised, and the *via media* was found, the truth accepted, that both processes were in the order of nature. The catastrophe, now known to be local, represents the accumulation of energy during long secular changes, accumulation which at length overbears restraint and ruins a tract, usually a small one. The devastation even of a large area by flood or earthquake does not mark the end of an epoch in the history of the earth, only in that of the area affected, elsewhere the history follows its even course. A few years will probably see the end of the biological discussion now beginning, and it will likely be on the same ground of compromise.

If, then, the speculative side of the mechanical theory is unsatisfactory, if Evolution cannot give better security that it stands on an assured basis, if the Darwinian hypothesis, in itself a particular case of Evolution, owes such confidence as it has inspired to the fact that it deals only with the world as it is and shrinks from the problem of origins, may we look to the organic world for evidence of design? That design should be proved, advances us little, for design explains nothing. What it is desirable to impress is that, in the absence of a solution which shall account for the origin and progress of every step in the beginning and development of organisms, it is worth while to seek for the grounds on which we may venture to initiate the successive generalisations from experience deemed by Mill the province

of science. Some are content with mechanism, others feel imperfectly instructed by such an answer: failing facts, we are thrown back on reason, and we find that personal character has much to do with the kind of answer deemed satisfactory. Those who find design adequate to their conception of the Cosmos have as little justification for reproaching the advocates of mechanism with limited capacity as these in turn have for hinting the intellectual limitation or doubtful honesty of their opponents.

Parasitism and the division of labour among the members of some insect communities are arrangements which no application of natural selection will aid us in accounting for. That a parasite should find its advantage in shifting from one animal to another during its development, that in each successive host it should pass through a new phase of activity and suitable form, and that in the last only it should acquire the power of multiplying, all this adaptation of means to ends is more than can be credited to mere natural selection. If anywhere we could find proof that the result had been obtained by tentative efforts, deliberate trials, if failure could be a step to success instead of ending the possibility of further experiment, we might believe that the strange order was so obtained. But there is no such evidence, the steps cannot be the fruit of experiment, for the adaptations must be precise just at the points where there is no conscious knowledge or choice on the part of the larva. It is not the larva which reproduces its kind, but the adult, after and because it has passed through all the previous stages and hosts—the right hosts. Thus an insect places its egg in the body of a larva or in the same cell with it, and the adjustment is sufficiently precise that the parasite is sure of an adequate food-supply, at the right time, at the cost of its victim, which is also its foster-mother: the two make equal advances towards maturity. Experience should in this case be acquired before the individual was in a state to learn:

experience could not, therefore, be transmitted—not even the negative experience of failure due to the choice of an unsuitable host: there is nothing, in truth, left to guide the next generation. If this were all fortuitous—if, as we are told, all this was fortuitous, mere chance, we might well turn on the exponents of unknown causes and ask why should reason again have the door slammed in her face by the dogmatic assertion of the unknown, the suggestion of the unknowable?

Not less striking is the distribution of workers in a colony of bees, where the selection (if there is selection) of eggs and their treatment for their future destiny is either an effort of wise discretion or implicit obedience to an impulse which certainly was never conceived in the nervous system of the insect: the duties of the neuter are not hereditary, it is barren.

We have here, no doubt, extreme cases from a field in which physical sequences do not suffice: these carry out, do not dictate the scheme. They serve to emphasise the need for taking into account the other half of the universe if we would approach Mill's ideal, the conception of an intellectual whole which he sees possible amid the complex details of nature. In face of this, in response to our quest of this, we have dogmatism as fatal to thought and even to enquiry as the Final Causes against which Bacon is erroneously credited with having directed his weighty censure: it was the spirit in which they were asserted that he denounced, the scholastic arrogance repugnant to his sceptical attitude. Against a similar arrogance it is now necessary to protest. And the protest is the more needed that "freedom from prejudice" is the motto under which it conceals itself. If it is counted evil (prejudice) to assert the existence of an Author of the world concerning whom we may at least have some beliefs, what shall be said for the demand that we should accept instead something, we know not what, save that we know

nothing regarding it, can have no beliefs of any sort? The assertion of incomprehensible causes is not an appeal to reason, it is the assertion of authority.

All things are set down to Evolution, and most people have been led to believe that this is the same thing as the Darwinian hypothesis, under which the co-operation of all is disguised under the strangely misused metaphor "struggle for existence," a metaphor drawn from the life of mammals and now abandoned even by its author. Now Herbert Spencer's Evolution is a Law, Darwin set forth a particular case of that Law: hence the latter may result in progress, the former contemplates progress as its essential: the two, therefore, have little in common. But Evolution implies design, and the language of those who adopt it as an escape from the necessity of admitting mind to a share in the world betrays that implication, while philosophers wonder that those who use the word as a shibboleth do not see what it involves. The thing evolved must have existed somewhere, not in material form, for we see in part and can infer the steps of its genesis. In thought it may have existed, in that intelligence which Huxley supposed might have foreseen the present in nebulous chaos.

Human reason is distrusted by some because of its supposed origin in the lower stock in common with which man's physical descent started. Now we know, so far as anything can be affirmed as known regarding the lower animals, that they never rise above sense-perception. But these, multiply them as you will, are not in the same category as conceptions, the subjective presentation of generalised sensations. The effort to establish Continuity between the mind of man and the intelligence of mammals by means of imaginary savages having no language save that of signs, or by means of hinted analogies between these hypothetical persons and the performances of parrots, is

unscientific, unphilosophical, and demonstrative of grave argumentative straits. To make even such arguments possible a further liberty is taken, and it is declared that speech is only a higher kind of sign-making, that speech is prior to conceptions, is the condition not the servant of thought. Vivid and weak sense impressions as steps in the passage from sensation to thought would be valid if it were proved that sense impressions are concepts.

Among the points at which Continuity breaks down, mention has been made of the gap between inorganic and organic matter. But change in the inorganic has been described in the language of Evolution as if the increase and diminution of matter and its alteration—which are of the essence of organic change—were the same thing as, nothing more than the readjustment, without change, of inorganic matter in crystalline or other definite form. The equivocation is as frequent as it is obvious. But mischievous nomenclature has been carried one step farther back. To atoms is attributed, by a mental abstraction, sentience, and their readjustments are then easily described as illustrations of natural selection. One is lost amid these wild aberrations, and can only regret that so many writers on biological and physical questions are ignorant of the laws of thought as they are careless of the superficial meanings of words.

Organic and inorganic changes, fundamentally unlike, go on concurrently, obedient to their respective laws, and contribute towards the harmony of the whole. They pursue separate courses which yet, from our point of view, converge on one result, the well-being of living things. It may be that man is the final purpose of all this harmony, it may be that the final purpose is beyond our ken! Of that science can say nothing. But the harmony is so striking that one cannot credit it wholly to chance. The series of consequents are enormous, their points of agreement

so rarely coincide, the sum is so constantly an average of agreement that one fails to find response to the doctrine of chances; in a world now of such antiquity there are no such recurrences as probability would lead us to expect. Is there no suspicion of design in the adjustment of means to ends in the fact that adjustment happens? We have only bald dogmatism to prevent its reference to the dictation of mind.

It is said that Darwin has set in clearer light the true Teleology: on enquiry this resolves itself into the mere restatement of the fact that adaptations do take place, that ends are reached by appropriate means: nothing more. The means are mechanical, the ends have no higher origin. This may be satisfactory to those who are content with mechanism, but not to those who seek the highest answer that science may venture to aim at, the answer which it is the duty of science to attempt. Mill enjoined successive generalisations from experience: but when the farthest limits of experience are reached, and its language is no longer available, it is still possible to formulate, if we keep in mind that an intellectual whole is contemplated, an explanation drawn from that other half of the universe which is so strangely utilised to prop a detail in an argument but ignored when a general theory is desired. Motion is explained by means of ether; but that is a mental device, not conceivable if conception is limited by experience. We hear a sound and respond to it: we hear an articulated sound and act on the meaning of the words, though the full meaning of these words to our minds would require for its description a time vastly longer than the interval between our hearing them and accomplishing the proper responsive act. What intervenes between hearing and action, we call thought. The succession is within our experience, but the unseen phenomena we can neither imagine nor conceive: there is no mechanical equivalent for them. We do not know how

thought is linked with brain, if it is linked. I speak as if it were uncertain, for this reason: Mind, self-conscious Mind, traced up from its dawn in early childhood has been held as within the domain of natural selection, and on this assumption has been founded the expectation that, like other of our inheritances from the lower stock, it, too, may be followed up from a lower to a higher form. But this is based on a false analogy, or rather on a fanciful resemblance: there is no intellect of the human sort in the lower animals from which the human possession might be traced. Embryology furnishes us with the skeletal framework which we see modified in transmission (to use the customary phrase), which we may verify in the youngest embryo. There is no such mental framework, no such basis of comparison. Even the assumption of it is barred by our ignorance of what passes in the infant. We may think to fall back on the development of brain; but though in that we perceive a certain kind of progression, we are no whit helped to understand the relation of thought to that brain. Say that the child has intellect by inheritance through countless generations, it yet learns from those in the active exercise of thought the proper forms in which to clothe its thoughts. We do not know that the child forms intellect for itself: we know that no animal has done so. It may be that in the child self-consciousness had no beginning, that contact with active intelligence only stimulated its manifestation: if so, we would be the more led to seek for it a higher than a lower origin.

Here we find ourselves with two alternatives: that of the metaphysicians as Maimonides, who find the soul (the mind) a part of the Universal Intelligence: the other is offered to us by Religion.